THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

DISSERTATION ON

A PROSPECTIVE COMPARATIVE STUDY ON LAPAROSCOPIC CHOLECYSTECTOMY VS OPEN CHOLECYSTECTOMY

submitted for

In partial fulfillment of the requirements for the degree of

M.S. GENERAL SURGERY – BRANCH I

DEPARTMENT OF GENERAL SURGERY

THANJAVUR MEDICAL COLLEGE AND HOSPITAL

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A PROSPECTIVE COMPARATIVE STUDY ON LAPAROSCOPIC CHOLECYSTECTOMY VS OPEN CHOLECYSTECTOMY

BY

DR.SRINATH. R

Dissertation submitted to the

THE TAMILNADU DR. M. G. R. MEDICAL UNIVERSITY

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Under the guidance of

Prof. Dr.V.KOPPERUNDEVI M.S.,

DEPARTMENT OF GENERAL SURGERY
THANJAVUR MEDICAL COLLEGE AND HOSPITAL

MAY, 2018

DECLARATION BY THE CANDIDATE

I solemnly declare that this Dissertation **"A PROSPECTIVE COMPARATIVE STUDY ON LAPAROSCOPIC CHOLECYSTECTOMY VS OPEN CHOLECYSTECTOMY"**was done by me in the Department of General Surgery, Thanjavur Medical College, and Hospital, Thanjavur under the Guidance and Supervision of my Professor Dr.V.KOPPERUNDEVI M.S. Department of General Surgery, Thanjavur Medical College, Thanjavur between 2016 and 2017.

This Dissertation is submitted to the Tamilnadu Dr. M.G.R Medical University, Chennai in partial fulfillment of University requirements for the award of M.S Degree (GENERAL SURGERY).

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This is to certify that this dissertation titled **"A PROSPECTIVE COMPARATIVE STUDY ON LAPAROSCOPIC CHOLECYSTECTOMY VS OPEN CHOLECYSTECTOMY"** is a bonafide research work done by **Dr.SRINATH. R** in partial fulfillment of the requirement for the degree of **M.S.GENERAL SURGERY – BRANCH I.**

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CERTIFICATE

This is to certify that the dissertation titled **"A PROSPECTIVE COMPARATIVE STUDY ON LAPAROSCOPIC CHOLECYSTECTOMY VS OPEN CHOLECYSTECTOMY"** is a bonafide research work done by **DR.SRINATH. R** under the guidance of **Dr.V.KOPPERUNDEVI M.S.,** (Associate Professor, Department of General Surgery) Thanjavur Medical College Hospital, Thanjavur.

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Dr. SRINATH. R

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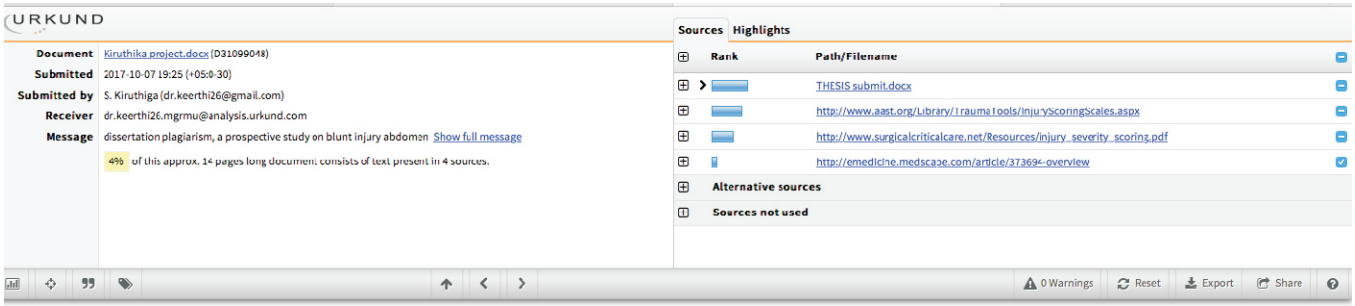


A PROSPECTIVE STUDY ON BLUNT INJURY ABDOMEN Introduction:

Abdominal trauma continues to account for a large number of trauma related injuries and deaths. Motor vehicle accicents, accidental fall are leading causes of blunt and penetrating trauma to abdomen. Blunt abdominal trauma is one of the leading preventable causes of the unnatural death in developed and developing ccuntries. Blunt trauma is particularly deceptive as the clinical manifestations of the injury may be delayed for hours or days even though internal damage is serious and sometimes lethal. In open cases of abdominal trauma the clinical manifestations, diagnosis and management will be easier but closed cases of abdominal trauma offers a great challenge to the treating surgeon. Injuries to the abdominal viscera, caused by blunt trauma, are particularly common in civilian life. The blunt trauma differs from penetrating trauma, as the different organs are characteristically injured by compression from blunt straining. The solid organs such as spleen, liver, kidney, pancreas, etc., are the most vulnerable, while the hollow viscera like stomach, intestines and bladder are less likely to be involved. The outstanding features of injury to solid organ are the haemorrhage and shock, while in hollow visceral injury shock follows with the development of peritonitis. The aim of this study is to analyse the incidence of hollow viscus perforation and solid organ injuries and find out the morbidity and mortality in blunt abdominal trauma.

A PROSPECTIVE COMPARATIVE STUDY ON LAPAROSCOPIC CHOLECYSTECTOMY VS OPEN CHOLECYSTECTOMY

INTRODUCTION

Gall stone disease is common in India, that too affecting mostly middle age group men and women.The classical open cholecystectomy and the minimally invasive laparoscopic cholecystectomy are two alternative operations for removal of the gallbladder. There are no significant differences in mortality and complications between the laparoscopic and the open techniques. The laparoscopic operation has advantages over the open operation regarding duration of hospital stay and convalescence. With the advent of laparoscopic cholecystectomy the scenario of surgical management of cholelithiasis has changed drastically. It has opened new horizons in the management of gallstones. Theoretical benefits of laparoscopic approach include reduced hospitalization and cost, decreased pain, avoidance of large incision with improved cosmetic purpose and reduced post-operative recovery time with an early return to work.

Although it showed early promising results, recent trials show an increase in the incidence of operative complications, especially common bile duct injury. Expensive instruments, specialized training and long learning curve also limit the use of laparoscopy. This has led to a lot of soul searching and numerous attempts at comparing the merits and demerits of laparoscopic

vsopen cholecystectomy. Recent upsurge in practice of laparoscopic surgery and other form of minimal access surgery has ushered a new era of surgical treatment, which is having profound effect on surgical management.

AIM OF THE STUDY

- To compare time taken for surgery.
- To compare and discuss the various operative complications in both the surgery.
- To compare the postoperative complications.
- To compare postoperative hospital stay.
- To compare pain duration in both surgeries.

MATERIALS AND METHODS

My study is a prospective randomized study included 88 patients with gallstones, who were admitted to Thanjavur medical college and hospital from September 2016 to September 2017. The selection of procedure of open cholecystectomy or laparoscopic was decided depending up on the inclusion and exclusion criteria, exception when patient consent was not given for a particular procedure. Information was collected from the patients after a written valid informed consent from them. The study was approved by IEC. Patients between 20 years to 60 years with acute cholecystitis, or chronic cholecystitis and gall stones without pain abdomen, were included in the study. Patient's written valid informed consent for the particular procedure was taken. Patients less than 20 years and more than 60 years or those with Gall bladder cancer and Choledocholithiasis were excluded. This study involved preoperative assessment, intraoperative practice and post-operative management and follow up till 3 months. All the patients were studied with reference to duration of surgery, post-operative analgesia, post-operative stay and morbidity, intra operative and post-operative complications.

Patients were admitted a day prior to surgery in case of elective cholecystectomy from OPD after complete investigations performed required for general anesthesia. Some patients were admitted from emergency department of hospital as they had presented with acute abdominal pain. These

patients were investigated for the same. Investigations performed in these patients include complete Haemogram, Blood sugar level, Urine examination, Liver function test, Blood urea and serum creatinine, Chest x-ray, ECG andUltrasonography of abdomen, CT abdomen. The patients were studied with respect to their clinical presentation and were grouped as patients with asymptomatic Gall stones, acute calculus cholecystitis and chronic calculus cholecystitis.

After complete investigations and after satisfying the inclusion and exclusion criteria for my study, patients were subjected to either open or laparoscopic cholecystectomy. First dose of antibiotics administered to the patient just prior to incision, immediately after intubation. General anesthesia was administered to all the patients. Foleys Catheterization and Ryle's tube insertion was done in all patients. Post-operative management included nil per oral tillbowel sounds were heard. Intravenous fluids in the form of crystalloids, Broad-spectrum antibiotics (Injcefotaxim) were administered. Injection Amikacin and Injection Metronidazole were added in cases of bile leak. Analgesics in the form of Injection Tramadol were given. Top-up analgesia in the form of intramuscular Injection Diclofenac Sodium was given, whenever it was required. Discharge after start of oral diet and without any signs of postoperative wound infection after first dressing change. If sign of wound infection were present then pus from wound was taken and sent for microbiological culture and sensitivity testing. Appropriate antibiotics started

after reports and wound care taken accordingly. Follow up in OPD for stitch removal after 7 days, if operative wound is healthy. All laparoscopic cholecystectomy converted to open cholecystectomy were considered as difficult laparoscopic cholecystectomy for evaluation of data

REVIEW OF LITERATURE

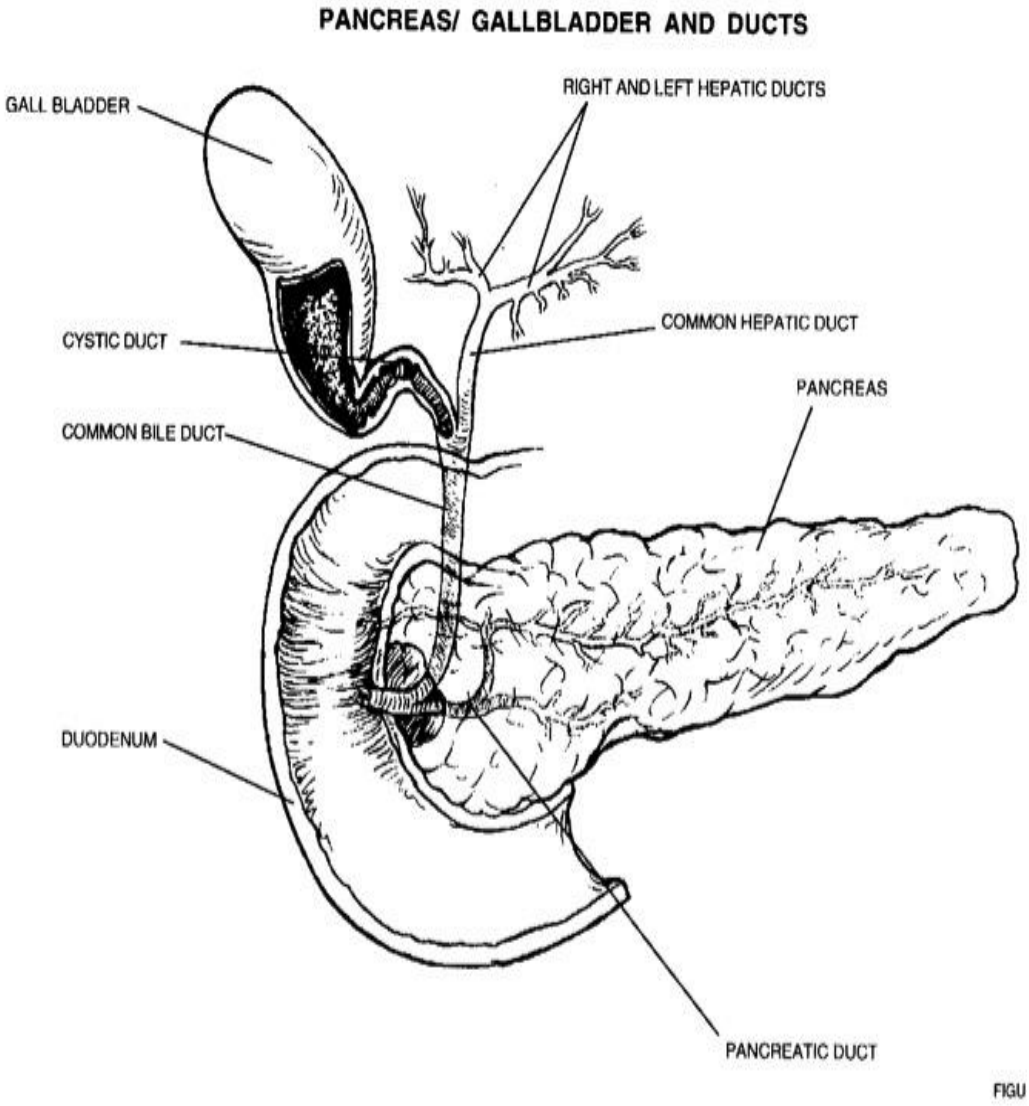
GALLBLADDER ANATOMY

The gallbladder is a pear-shaped, hollow structure located under the liver and on the right side of the abdomen. It has an inferior peritoneal surface and a superior hepatic surface that is closely applied to the gallbladder bed in the liver. The cystic plate is a condensation of fibro-areolar tissue that separates the gallbladder from the liver parenchyma. Small bile ducts may drain from liver parenchyma to the gallbladder through the cystic plate (ducts of Luschka), this may result in bile leak and collection, even without an apparent bile duct injury, during cholecystectomy. The part of the gallbladder projecting beyond the undersurface of the liver is called the fundus, which continues into the main body of the gallbladder, which lies in a fossa on the undersurface of the liver. The body of the gallbladder narrows into an infundibulum, which leads through the neck to the cystic duct. The cystic duct has spiral folds of mucosa called "valves" of Heister. An inferior sacculation (outpouching) of the gallbladder infundibulum or neck is sometimes present, this is called the Hartmann pouch. The Calot's triangle is bounded by the cystic duct on the right, common hepatic duct (CHD) on the left, and undersurface of the liver above; the cystic artery and cystic lymph node lie in the Calot triangle. A peritoneal fold (cholecysto-duodenal fold) connects the gallbladder neck to the first part of the duodenum. The right and left hepatic ducts join outside the liver in its hilum (portahepatis) to form the common hepatic duct (CHD). The cystic duct joins the CHD to

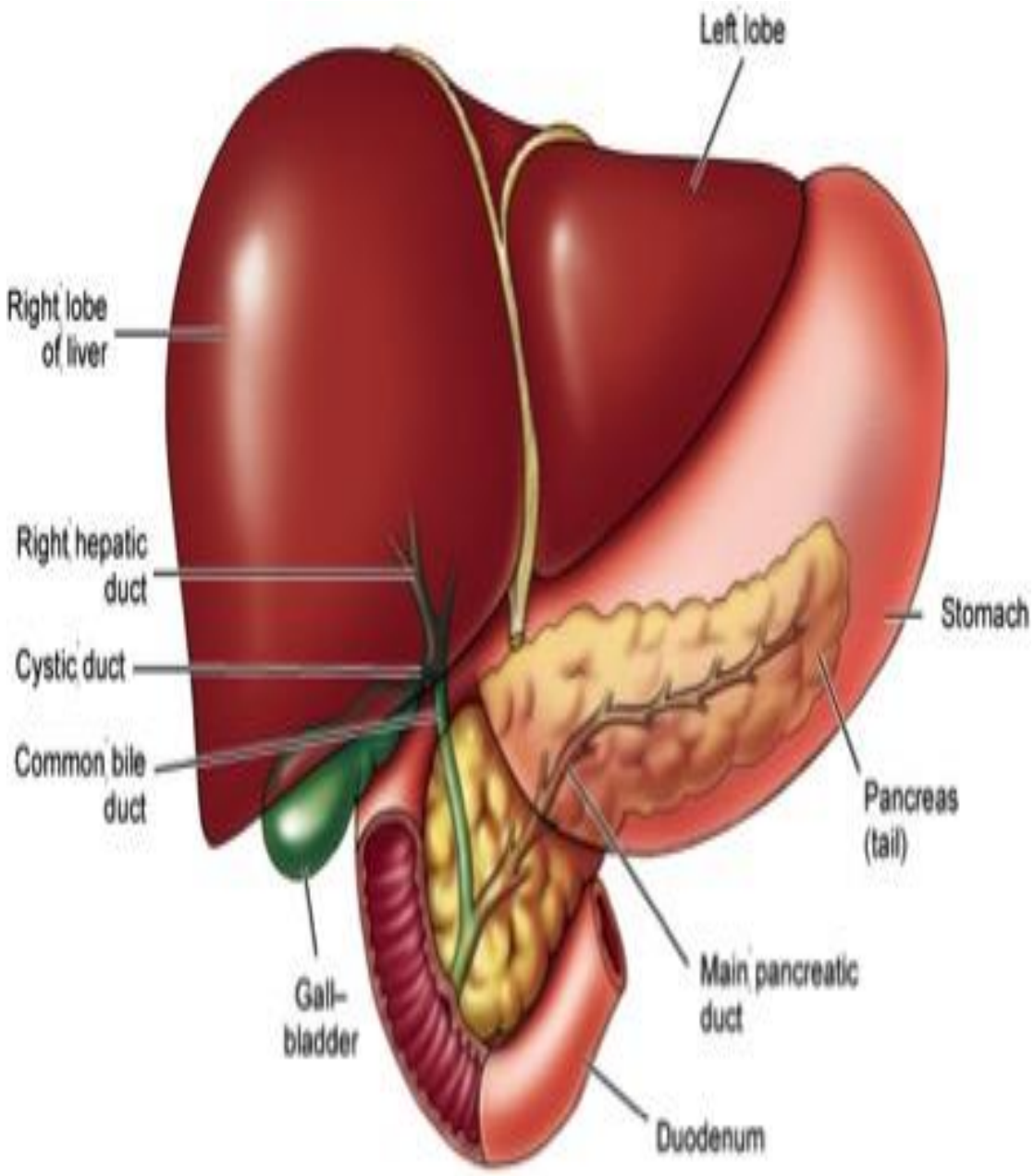
form the common bile duct (CBD), which travels downward in the HDL along with the hepatic artery to its right and the portal vein behind it. The upper limit of the diameter of the normal CBD is 6-7 mm.

The CBD has supraduodenal, retroduodenal (behind the first part of the duodenum), infra or retropancreatic (in a groove or sulcus behind or a tunnel through the upper half of the head of the pancreas) and intraduodenal (intramural) parts. The gallbladder is part of the biliary tract. The terminal part of the CBD is joined by the terminal part of the pancreatic duct in the head of pancreas to form a common channel (called the hepatopancreatic ampulla), which runs through the medial duodenal wall and opens on the dome of the greater duodenal papilla, on the medial wall of the middle segment of the second part of the duodenum. A smooth muscle sphincter called p of Oddi is present around the common channel of the CBD and the main pancreatic duct and prevents reflux of duodenal juice into the 2 ducts. Two other individual smooth muscle sphincters are present around the terminal parts of the CBD (sphincter of Boyden) and the main pancreatic duct before they join; these prevent reflux of pancreatic juice into the CBD and bile into the main pancreatic duct.

GALL BLADDER ANATOMY



GALL BLADDER AND LIVER SURGICAL ANATOMY



FUNCTION

The gallbladder serves as a reservoir for bile while it's not being used for digestion. The gallbladder's absorbent lining concentrates the stored bile. When food enters the small intestine, a hormone called cholecystokinin is released, signaling the gallbladder to contract and secrete bile into the small intestine through the common bile duct.

The bile helps the digestive process by breaking up fats. It also drains waste products from the liver into the duodenum, a part of the small intestine.

PRESENTATION OF GALLBALDDER DISEASE

- **BILIARY COLIC** (intermittent duct blockage)/ABDOMINAL PAIN - The most common symptom of a gallbladder problem is pain. This pain usually occurs suddenly and rapidly increasing in the right upper abdomen or epigastric area. Some will have pain radiating to the right shoulder (or back pain in the tip of the scapula) and also develop nausea and vomiting. The pain usually subsides in about 1 to 5 hours although a mild ache may persist for about a day. It can be mild and intermittent. It can be quite severe and frequent.
- **NAUSEA AND VOMITING** - These are common symptoms of all types of gallbladder problems. Chronic gallbladder disease may cause digestive problems, such as regurgitation or acid reflux, nausea and vomiting.
- **FEVER WITH CHILLS** -Fever may signal that you have an infection.

If you have an infection, you need treatment before it worsens and becomes very severe. The infection can become life-threatening if it spreads to other parts of the body.

- **CHRONIC DIARRHEA** - Having more than four bowel movements per day for at least three months may be a sign of chronic gallbladder disease.
- **JAUNDICE** – it may be a sign of a common bile duct block or stone.
- **UNUSUAL STOOLS OR URINE** - light colored and high colored urine are possible signs of a common bile duct block.

Disease of gall bladder

- **CHOLELITHIASIS**(Gallstones)- For unknown reasons, substances in bile gets crystallize in the gallbladder, forming gallstones. It is common and it isharmless,but gallstones can sometimes cause pain, nausea, or inflammation.

  Gall Stones

- **Types:**
  - Cholesterol gallstones
    - Cholesterol gallstones are made primarily of cholesterol. They are the most common type of gallstone, comprising 80% of gallstones in individuals from Europe and the Americas. Cholesterol is one of the substances that liver cells secrete into bile.

- **Pigment gallstones**
- Pigment gallstones are the second most common type of gallstone.
    - There are two types of pigment gallstones 1) black pigment gallstones, and 2) brown pigment gallstones.
        - **Black pigment gallstones:** too much bilirubin in bile
        - **Brown pigment gallstones**: If there is reduced contraction of the gallbladder or obstruction to the flow of bile through the ducts, bacteria may ascend from the duodenum into the bile ducts and gallbladder. The bacteria alter the bilirubin in the ducts and gallbladder, and the altered bilirubin then combines with calcium to form pigment.

Pathogenesis for gall stone disease:

- metabolic
- infections and infestations
- bile stasis
- increased bilirubin production
- saints triad: gall stones, diverticulosis of colon,hiatus hernia.

Factors affecting cholesterol to bile salts ratio:

- obesity

- ocp
- ileal disease
- ileal resection
- alteredenterohepatic circulation

Gall stone colic:

Sudden , severe , colicky abdominal pain in right hypochondrium which radiates to back and shoulder.

-tendernesss in right hypochondrium

-aggravated by lying position in night

-there is reflux pylorospasm causing vomiting.

MIRIZZI syndrome:

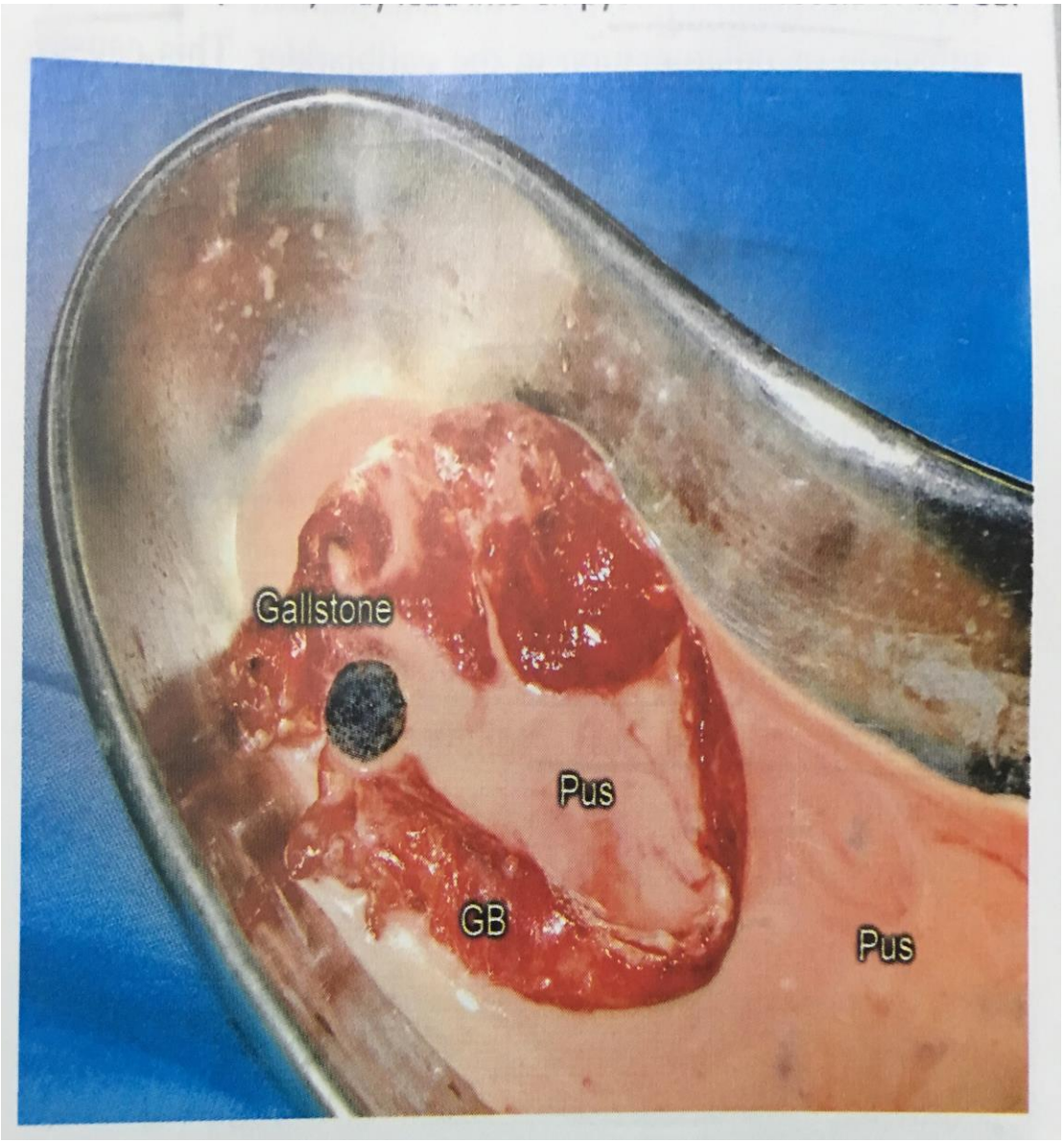
-gall stone gets impacted in the gall bladder wall and compress causing pressure necrosis

- type 1: compression of CBD without lumen narrowing,
- type 2: compression causing lumen narrowing,
- type 3 : compression causing CBD wall necrosis
- type 4: cholecysto-choledocal fistula.

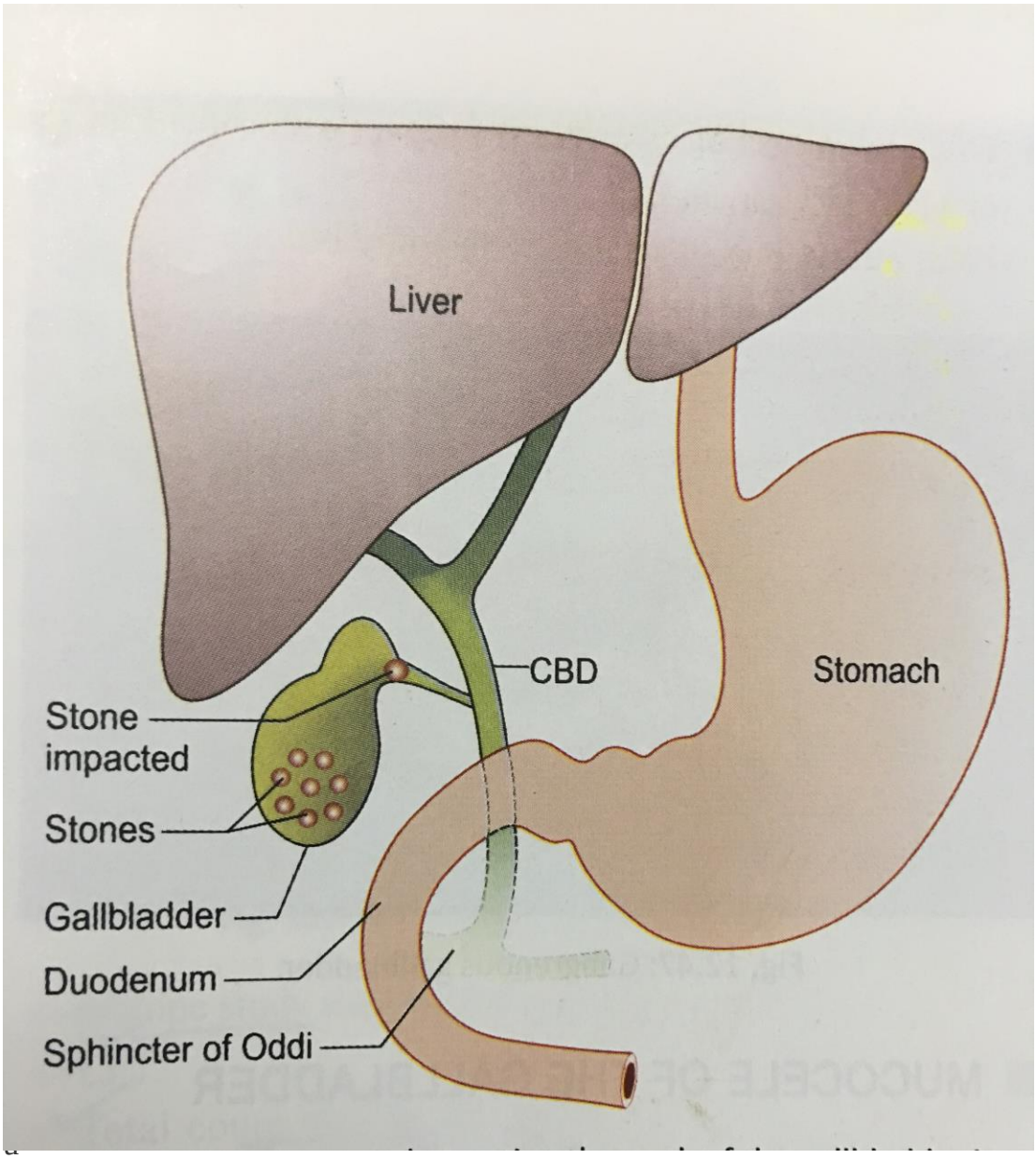
GALL STONES

EMPYEMA GALL BLADDER

PUS WITH GALL STONES



GALL STONE OBSTRUCTING NECK OF GB



CHOLECYSTITIS

CHOLECYSTITIS - Infection of the gallbladder, often due to a gallstone in the gallbladder. Cholecystitis causes severe pain and fever, and can require surgery when infection continues or recurs.

Acute cholecystitis:

- occurs following chronic cholecystitis
- usual cause is impacted gall stone in hartmanns pouch obstructing cystic duct.

Types

Acute calculouscholecystitis

Acute acalculouscholecystitis

Complications:

- perforation
- Peritonitis
- Pericholecystitis abscess
- Empyema GB
- Cholangitis
- Septicemia

ACALCULOUS CHOLECYSTITIS

Acalculouscholecystitis is an inflammatory disease of the gallbladder without evidence of gallstones or cystic duct obstruction. It is a severe illness that is a complication of various other medical or surgical conditions. Duncan first recognized it in 1844 when a fatal case of acalculouscholecystitis

complicating an incarcerated hernia was reported. The condition causes approximately 5-10% of all cases of acute cholecystitis and is usually associated with more serious morbidity and higher mortality rates than calculouscholecystitis.

It is most commonly observed in the setting of very ill patients (eg, on mechanical ventilation, with sepsis or severe burn injuries, after severe trauma ·In addition, acalculouscholecystitis is associated with a higher incidence of gangrene and perforation compared to calculous disease.

The usual finding on imaging studies is a distended acalculous gallbladder with thickened walls (>3-4 mm) with or without pericholecystic fluid. Acalculouscholecystitis can be observed in patients with human immunodeficiency virus (HIV) infection, although it is a late manifestation of this disease. Acalculouscholecystitis can also be found in patients on total parenteral nutrition (TPN), typically those on TPN for more than 3 months

PATHOPHYSIOLOGY:

The main cause of this illness is thought to be bile stasis and increased lithogenicity of bile. Critically ill patients are more predisposed because of increased bile viscosity due to fever and dehydration and because of prolonged absence of oral feeding resulting in a decrease or absence of cholecystokinin-induced gallbladder contraction. Gallbladder wall ischemia that occurs because of a low-flow state due to fever, dehydration, or heart failure may also play a role in the pathogenesis of acalculouscholecystitis

ETIOLOGY

The main cause of acalculouscholecystitis is gallbladder stasis with resulting stagnant bile. This is observed most commonly in patients with sepsis, patients in intensive care units, patients on long-term total parenteral nutrition (TPN), those with cardiovascular disease, patients with diabetes (occasionally), or other patients with gallbladder dysmotility. The condition has been reported during pregnancy, as a complication of hepatitis A.It has been rarely reported in children, also as a complication of hepatitis A,with a favorable course with conservative treatment. This disease has also been reported as associated with aortic dissection.

PROGNOSIS

The prognosis of patients with acalculouscholecystitis is guarded. The mortality and morbidity rates associated with acalculouscholecystitis can be high. The illness is frequently observed in patients with sepsis or other serious conditions. The reported mortality range is 10-50% for acalculouscholecystitis as compared to 1% for calculouscholecystitis.

COMPLICATIONS

Perforation or gangrene of the gallbladder and extrabiliary abscess formation may occur

CHRONIC CHOLECYSTITIS

CAUSES

This condition usually begins with the formation of gallstones in the gallbladder. Gallstones may depend on several factors, including:

- genetic predisposition
- weight
- gallbladderinactivity
- dietary habits

Gallstones form when substances in the bile form crystal-like particles. They can range from the size of a grain of sand to the size of a golf ball. The presence of gallstones causes pressure, irritation, and may cause infection. The walls of the gallbladder begin to thicken over time. Eventually, the gallbladder starts to shrink. These changes make it harder for the gallbladder to function properly.

In addition to gallstones, cholecystitis can be due to:

- Infection of the CBD drainage system
- CBD blockage
- Excess cholesterol in the gallbladder, which can happen during pregnancy after rapid weight loss
- Decreased blood supply to the gallbladder because of diabetes
- Tumors in the liver or pancreas
- Tumors in the gallbladder, which is rare

Repeated or prolonged attacks of cholecystitis, it becomes a chronic condition.

SYMPTOMS

Symptoms of cholecystitis can appear suddenly or develop slowly over a period of years. Most of the time these symptoms appear after a meal that is high in fat.

Symptoms include:

- Severe abdominal pains that may feel sharp or dull
- Abdominal cramping and bloating
- Pain radiates to back or below right shoulder blade
- Fever
- Chills
- Nausea
- Vomiting
- Loose, light-colored stools
- Jaundice
- Itching

A typical attack can last two or three days, but symptoms of cholecystitis vary widely from person to person. The symptoms appear on the right or middle upper part of your stomach. The pain will usually last for 30 minutes.

Complications can include:

- Pancreatitis, an inflammation of the pancreas
- Perforation of the gallbladder as a result of infection
- Enlarged gallbladder due to inflammation
- Infection may cause the bile to build up
- Cancer of the gallbladder (this is a rare, long-term complication)
- Death of gallbladder tissue (this can lead to a tear and ultimately a burst of the organ)

TREATMENT

The symptoms of cholecystitis can be treated at home with pain medication and rest, if have been properly diagnosed. Take antibiotics and avoid fatty foods.

Treatment options for cholecystitis

The specific cause for attack will determine the course of treatment. The options include:

- broad-spectrum antibiotics for fighting infection
- oral dissolution therapy using medications to help dissolve gallstones (this is typically a last resort, reserved for individuals who cannot undergo surgery)
- pain relievers for controlling pain during treatment

Surgery is often the course of action in cases of chronic cholecystitis. Today, gallbladder surgery is generally done laparoscopically.. In most cases, the

surgery is an outpatient procedure, which means a shorter recovery time.

Emphysematous cholecystitis:

Emphysematous cholecystitis is a rare form of acute cholecystitis where gallbladder wall necrosis causes gas formation in the lumen or wall. It is a surgical emergency, due to the high mortality from gallbladder gangrene and perforation.

EPIDEMIOLOGY

Men are affected twice as commonly as women (reverse is true in most cases of acute cholecystitis).The majority of patients are between 50 and 70 years of age and have underlying diabetes mellitus.

CLINICAL PRESENTATION

Clinical manifestation is often insidious and may then progress rapidly. Up to one-third of patients may be afebrile and localised tenderness is often not a dominant clinical feature.

PATHOLOGY

Vascular compromise of the cystic artery is thought to play a significant role in causing emphysematous cholecystitis. It is associated with acalculouscholecystitis (present in ~50% of cases 9-11) and carries a higher incidence of gallbladder perforation. Commonly isolated organisms include *Clostridium welchii / perfringens*, *Escherichia coli* and *Bacteroidesfragilis*.

RADIOGRAPHIC FEATURES

On imaging, the condition is diagnosed when there is radiographic

demonstration of air in the gallbladder wall +/- biliary ducts, in the absence of an abnormal communication with thegastrointestinal tract .

ULTRASOUND

Ultrasonography may demonstrate highly echogenic reflectors with low-level posterior shadowing and reverberation artifact ("dirty" shadowing and "ring-down" artifact) .

A less common but more specific finding is small, non-shadowing echogenic foci rising up from the dependent portions of the gallbladder lumen, similar to effervescing bubbles in a glass of champagne (champagne sign).

CT

CT is considered the most sensitive and specific imaging modality for identifying gas within the gallbladder lumen or wall . The presence of a pneumoperitoneum indicates perforation.

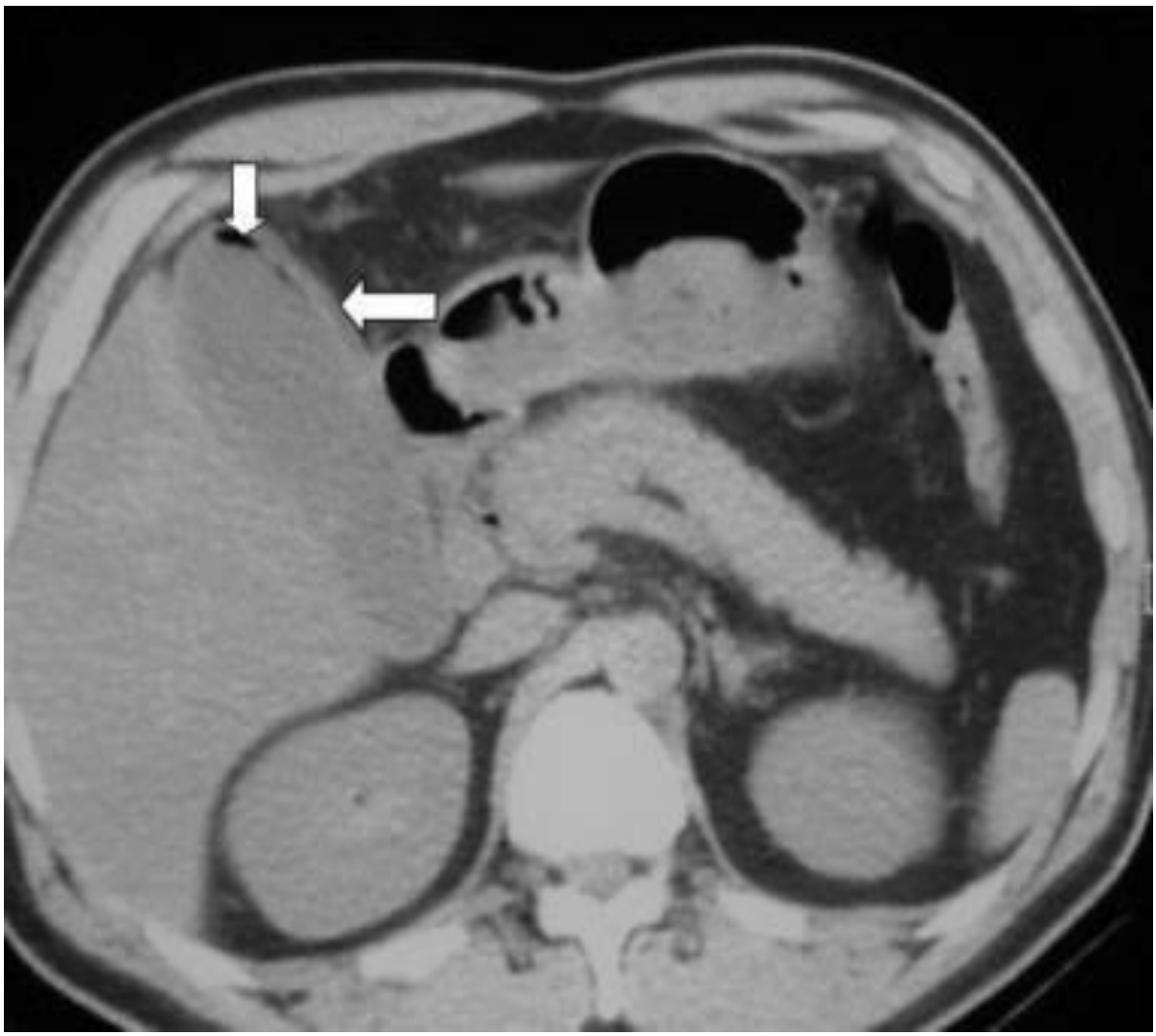
NUCLEAR MEDICINE

Hepatobiliary nuclear imaging may demonstrate non-visualisation of the gallbladder, along with a region of increased hepatic activity adjacent to the gallbladder fossa. This feature is sometimes termed the rim sign.

Treatment and prognosis

Treatment is emergent surgical intervention. Overall mortality rate is ~20% (range 15-25%), compared with <5% in uncomplicated cases of acute cholecystitis.

CT PICTURE OF EMPHYSEMATOUS CHOLECYSTITIS



CT AND X-RAY PICTURE OF EMPHYSEMATOUS CHOLECYSTITIS

ACUTE CHOLECYSTITIS IN PREGNANCY

In most cases, cholecystitis pregnancy may be due to the trapping of gallstones at the opening of the gallbladder. When pregnant, there is a decrease in gallbladder motility. There is also an increase in the cholesterol saturation of bile. An infection in the bile can also cause an inflammation of the gall bladder.

The following conditions can also increase the risk of cholecystitis:

- Obesity or sudden weight gain (that can be the case in pregnancy)
- Sudden loss in weight (that can also be the case in certain pregnancies)
- Diabetes
- Crohn's disease
- Hyperlipidemia
- Family history of gallstones, especially on the maternal side

SYMPTOMS

Symptoms of cholecystitis during pregnancy are overlooked, as they may be similar to regular pregnancy aches. However, the pain can soon turn worse and cause much discomfort.

Some of the common symptoms of cholecystitis are the following:

- Pain in the upper right part of your abdomen. The pain can also radiates towards back or right shoulder blade.
- There may be persistent feeling of nausea or vomiting. As these two symptoms are common in pregnancy, you may not find it alarming

and ignore it initially.

- Fever

TREATMENT

Laparoscopic cholecystectomy is a treatment option in the second trimester for patients suffering from acute cholecystitis.

It can be quite difficult to treat cholecystitis during pregnancy. Adopt a disciplined lifestyle and healthy eating habits to prevent the condition from getting worse. Do not ignore the symptoms as part of your pregnancy.

GALLBLADDER DISEASE WITHOUT STONES

Gallstones don't cause every type of gallbladder problem. Gallbladder disease without stones, also called acalculous gallbladder disease, can occur. In this case, patients experience symptoms commonly associated with gallstones without actually having stones.

COMMON BILE DUCT INFECTION(cholangitis)

An infection may develop if the common bile duct is obstructed either due to stones or tumor. Treatment for this condition is successful if the infection is found early. If it's not, the infection may spread and become fatal.

EMPYEMA (Abscess of the gallbladder)

A small percentage of people with gallstones may also develop pus in the gallbladder. Pus is a combination of white blood cells, bacteria, and dead tissue. This leads to severe abdominal pain. If the condition is not diagnosed

and treated, it can become life-threatening as the infection spreads to other parts of the body.

GALLSTONE PANCREATITIS

An impacted gallstone blocks the ducts that drain the pancreas. Inflammation of the pancreas occurs.

GALLBLADDER POLYPS

These growths are typically benign, or noncancerous. Small gallbladder polyps may not need to be removed. In most cases, they don't pose any risk to you or your gallbladder. But larger polyps may need to be surgically removed before they develop into cancer or cause other problems.

PORCELAIN GALLBLADDER

A healthy gallbladder has very muscular walls. Over time, calcium deposits can stiffen the gallbladder walls, making them rigid. This condition is called porcelain gallbladder. People with this condition have a high risk of developing gallbladder cancer.

GALLBLADDER CANCER

Although rare, cancer can affect the gallbladder. It is difficult to diagnose and usually found at late stages when symptoms appear. Symptoms may resemble those of gallstones

GALLBLADDER TESTS

- **ULTRASOUND ABDOMEN** - a noninvasive test in which a probe on the skin bounces high-frequency sound waves off structures in the belly.

Ultrasound is an excellent test for gallstones and to check the gallbladder wall.

The most sensitive US finding in acute cholecystitis is

- The presence of cholelithiasis in combination with the sonographic Murphy sign.

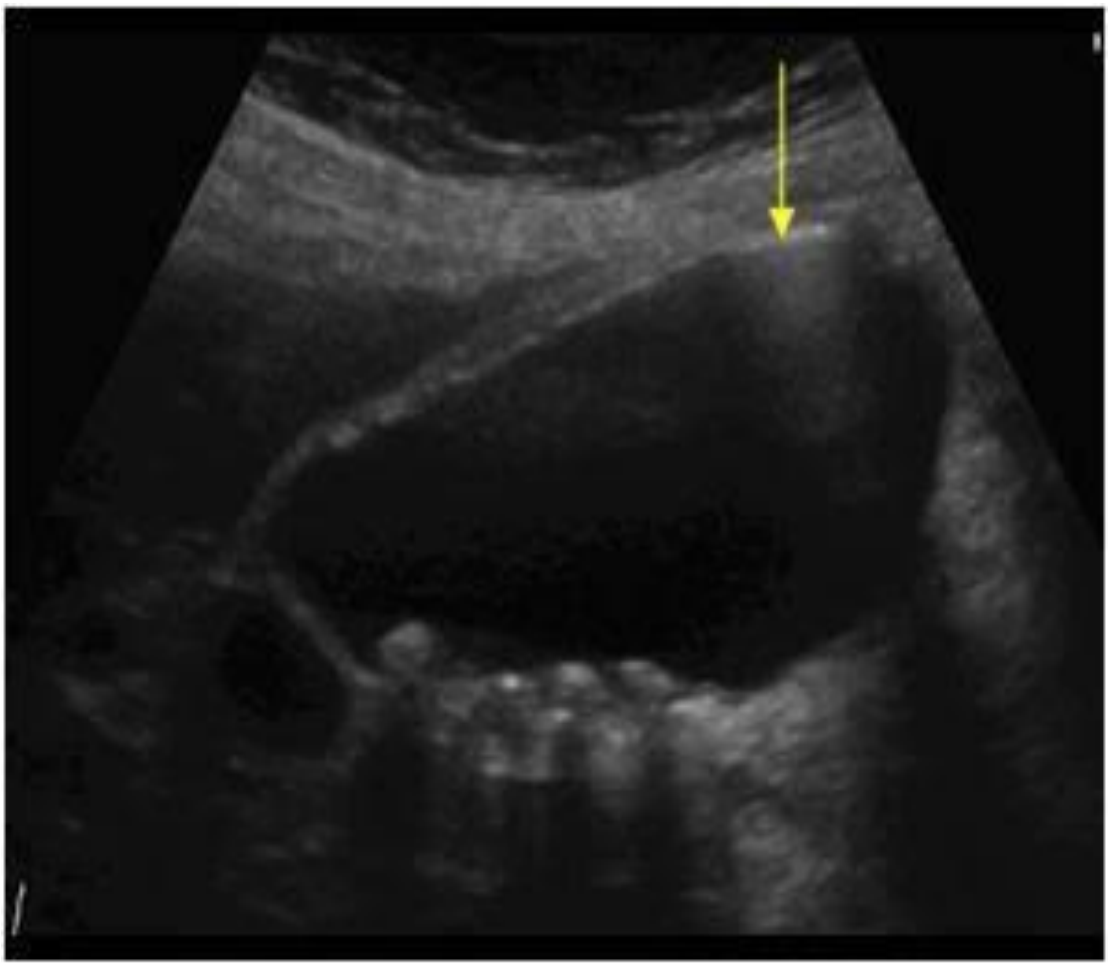
I. Gallbladder wall thickening (>3 mm)

II. pericholecystic fluid are secondary findings.

Other less specific findings include gallbladder distension and sludge. Every effort should be made to demonstrate the obstructing stone in the gallbladder neck or cystic duct.

GALL STONE IN ULTRASONOGRAM WITH POST ACOUSTIC SHADOW

ULTRASOUND SHOWING WALL THICKNESS IN ACUTE CHOLECYSTITIS



COMPUTED TOMOGRAPHY OF ABDOMEN

Although less sensitive than ultrasound, CT findings include

- Cholelithiasis: isodense to bile will be missed on CT
- Gallbladder distension
- Gallbladder wall thickening
- Mural or mucosal hyperenhancement
- Pericholecystic fluid and inflammatory fat stranding
- Enhancement of the adjacent liver parenchyma due to reactive hyperaemia
- Tensile gallbladder fundus sign

  Fundus bulging the anterior abdominal wall

  ~75% sensitivity and ~95% specificity for acute cholecystitis in the absence of any other CT features

Diagnostic criteria on CT as proposed by Mirvis et al include :

Major Criteria

- Gallstones
- Thickened Gallbladder Wall
- Pericholecystic Fluid Collections
- SubserosalOedema

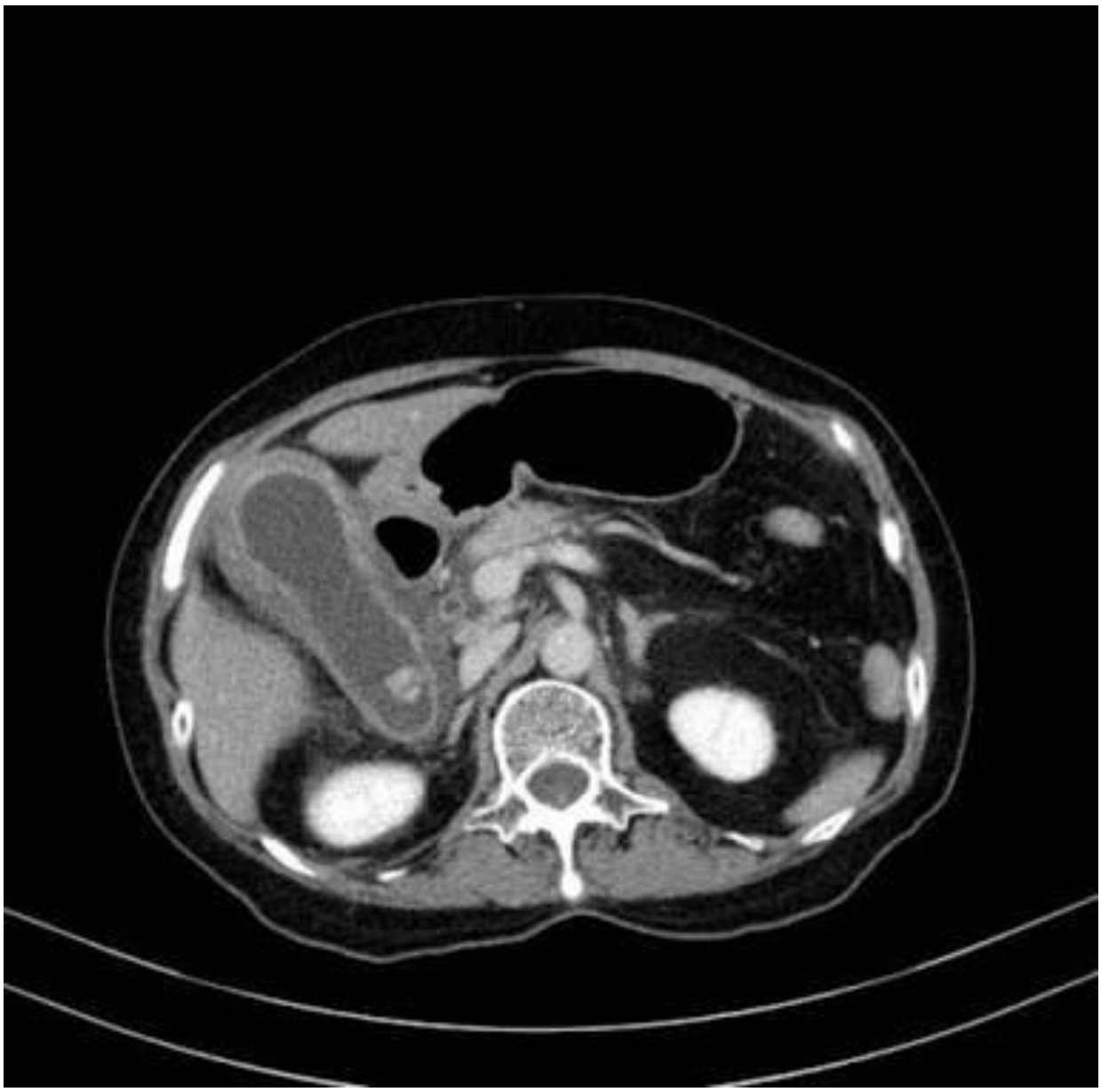
Minor Criteria

- Gallbladder Distention
- Sludge

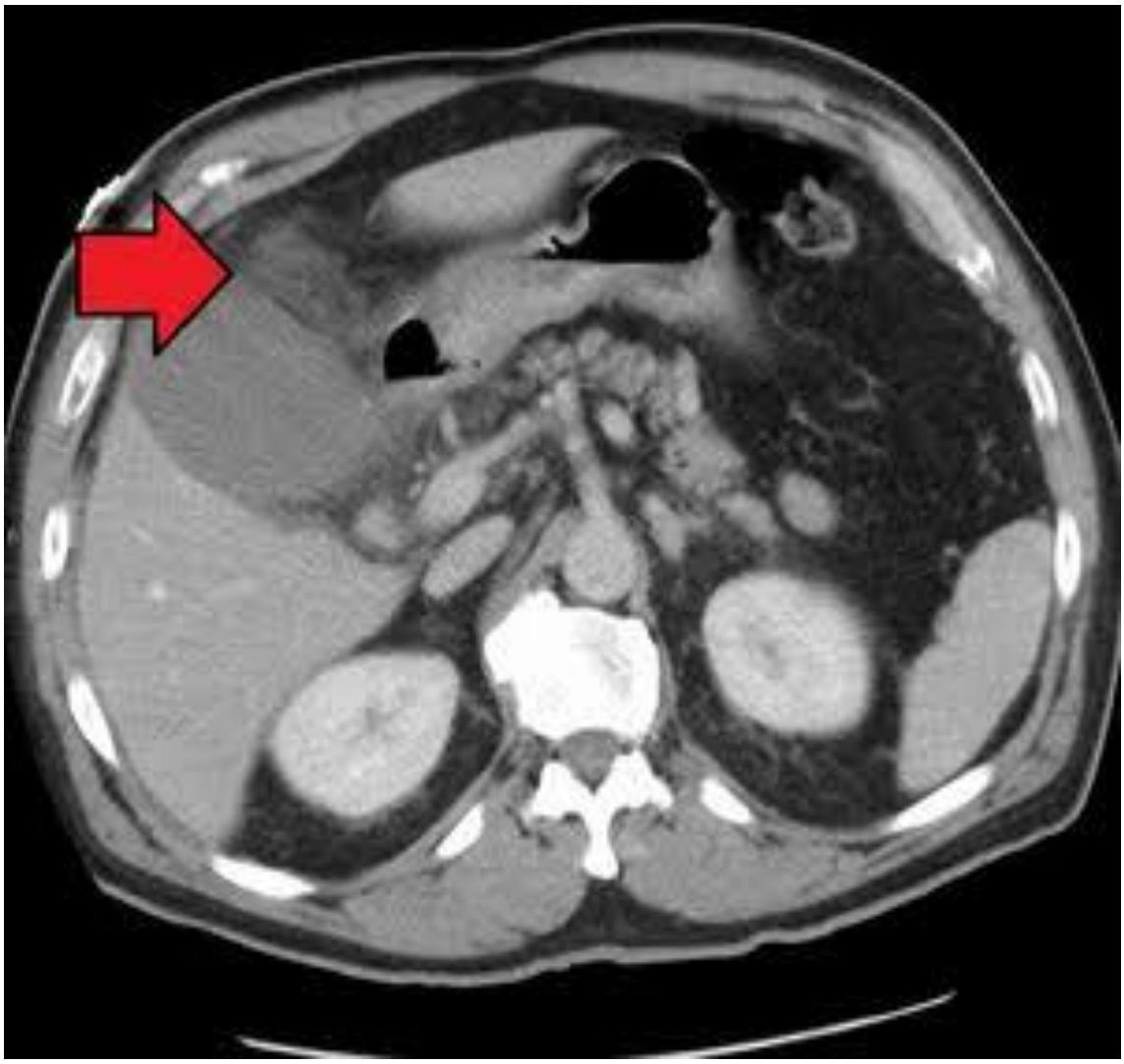
diagnosis of acute cholecystitis can be supported if one major and two minor criteria are present.

CT PICTURE OF ACUTE CHOLECYSTITIS WITH

PERICHOLECYSTIC FLUID



CT PICTURE OF ACUTE CHOLECYSTITIS



- **HIDA SCAN** (cholescintigraphy) - In this nuclear medicine test, radioactive dye is injected intravenously and is secreted into the bile. Cholecystitis is likely if the scan shows bile doesn't make it from the liver into the gallbladder.
- **ENDOSCOPICRETROGRADECHOLANGIOPANCREATOGRAPHY(ERCP)** - Using a flexible tube inserted through the mouth, through the stomach, and into the small intestine, a doctor can see through the tube and inject dye into the bile system ducts. Tiny surgical tools can be used to treat some gallstone conditions during ERCP.
- **MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY(MRCP)** - An MRI scanner provides high-resolution images of the bile ducts, pancreas, and gallbladder. MRCP images help guide further tests and treatments.
- **EUS** (Endoscopic ultrasound)- A tiny ultrasound probe on the end of a flexible tube is inserted through the mouth to the intestines. Endoscopic ultrasound can help detect choledocholithiasis and gallstone pancreatitis.
- **XRAY OF ABDOMEN** - Although they may be used to look for other problems in the abdomen, X-rays generally cannot diagnose gallbladder disease. However, X-rays may be able to detect gallstones.

TREATMENT OF CHOLECYSTITIS

Treatment of cholecystitis depends on the severity of the condition and the presence or absence of complications. Uncomplicated cases can often be treated on an outpatient basis. Complicated cases may necessitate a surgical approach. In patients who are unstable, percutaneous transhepaticcholecystostomy drainage may be appropriate. Antibiotics may be given to manage infection. Definitive therapy involves cholecystectomy or placement of a drainage device.

In acute cholecystitis, the initial treatment includes bowel rest, intravenous hydration, correction of electrolyte abnormalities, analgesia, and intravenous antibiotics. For mild cases of acute cholecystitis, antibiotic therapy with a single broad-spectrum antibiotic is adequate. Regimens include a third-generation cephalosporin plus metronidazole

- Bacteria that are commonly associated with cholecystitis include Escherichia coli and Bacteroidesfragilis, as well as Klebsiella, Enterococcus, and Pseudomonas species.
- Emesis can be treated with antiemetics and nasogastric suction.
- Because of the rapid progression of acute acalculouscholecystitis to gangrene and perforation, early recognition and intervention are required.
- Supportive medical care should include restoration of hemodynamic stability and antibiotic coverage for gram-negative enteric flora and anaerobes if biliary tract infection is suspected.

CONSERVATIVE TREATMENT OF UNCOMPLICATED

CHOLECYSTITIS

Outpatient treatment may be appropriate for cases of uncomplicated cholecystitis. If a patient can be treated as an outpatient, discharge with antibiotics, appropriate analgesics, and definitive follow-up care. Criteria for outpatient treatment include the following:

- Afebrile with stable vital signs
- No evidence of obstruction by laboratory values
- No evidence of common bile duct obstruction on ultrasonography
- No underlying medical problems, advanced age, pregnancy, or immunocompromised condition
- Adequate analgesia
- Reliable patient with transportation and easy access to a medical facility
- Prompt follow-up care

SURGICAL MANAGEMENT

TREATMENT

Most common treatment is surgical management.

Two common ways of surgical treatment

- Open cholecystectomy
- Laparoscopic cholecystectomy

Acute cholecystitis is a common medical condition that is

conventionally treated surgically. The gold standard of management is cholecystectomy, utilizing either the open or laparoscopic approach. However, early surgical intervention may result in increased morbidity and mortality in cases involving the elderly, patients with multiple comorbidities, or those with advanced cholecystitis. In such patients, urgent or early gallbladder drainage (GBD) can be used either as a temporary measure prior to surgery or as the definitive treatment.

Percutaneous trans-hepatic gallbladder drainage (PTGBD) is an effective measure for the temporary decompression of the gallbladder. However, this procedure is limited in patients with severe coagulopathy, thrombocytopenia, or anatomically inaccessible gallbladders. Additional associated risks include catheter dislodgment, cellulitis, pneumothorax, bleeding, fistulas, and infection. Frequently, the external catheter can cause significant pain and cosmetic disfigurement that can adversely affect the patient's quality of life. PTGBD may also need to be performed repeatedly, as the stent may need to be upsized. Moreover, there is a high recurrence rate of cholecystitis when the catheter is removed.

Two endoscopic methods, the endoscopic transpapillary gallbladder drainage (ETGD) and endoscopic ultrasound-guided transmural GBD (EUS-GBD) have been described in patients who are poor surgical candidates. In retrospective studies, ETGD has a pooled technical success rate of 80.9%. This technique may not be feasible if the cystic duct cannot be opacified during a cholangiogram or the guidewire cannot be advanced through the cystic duct

into the gallbladder due to tortuosity or obstruction. As an alternative, EUS-GBD has been proposed as a safe and effective method for draining the gallbladder. EUS-GBD involves using EUS to perform a transmural puncture of the gallbladder usually by the transgastric or transduodenal route with the placement of either a drain or stent in the fistula tract in order to facilitate drainage.

Laparoscopic cholecystectomy is the standard of care for the surgical treatment of cholecystitis.

The guidelines include detailed recommendations for making the decision to operate, performing the procedure, and managing postoperative care, with the patient's safety always the primary consideration.

Recommendations are as follows

- Preoperative antibiotics should be considered only to reduce the possibility of wound infection in high-risk patients, and then limited to one preoperative dose.
- Intraoperative cholangiography may improve injury recognition and decrease the risk of bile duct injury.
- If bile duct injury occurs, the patient should be referred to an experienced hepatobiliary specialist before any repair is undertaken, unless the primary surgeon has experience with biliary reconstruction.

Early operation within 72 hours of admission has both medical and socioeconomic benefits and is the preferred approach for patients treated by

surgeons with adequate experience in laparoscopic cholecystectomy. Immediate cholecystectomy or cholecystotomy is usually reserved for complicated cases in which the patient has gangrene or perforation.

STEPS OF CHOLECYSTECTOMY

OPEN CHOLECYSTECTOMY

Indication

- If laparoscopic cholecystectomy is contraindicated
- Intra operative conversion during laparoscopic cholecystectomy
- Gallbladder carcinoma
- Cholecystitis
- Cholelithiasis

Contraindication:

Contraindicated if laparoscopic cholecystectomy is indicated and can be performed.

Advantages:

- Better exposure during surgery
- Less risk of wound infection
- Less days off work

Disadvantages:

- Larger incision is made and leaves large scar.

- Longer hospital stay
- ≥ 5 days.
- Longer recovery time.
- Post-operative pain.

PRE-OPERATIVE MANAGEMENT AND ANESTHESIA

NPO over night .

Place the patient under general anesthesia, supine position, with arms extended.

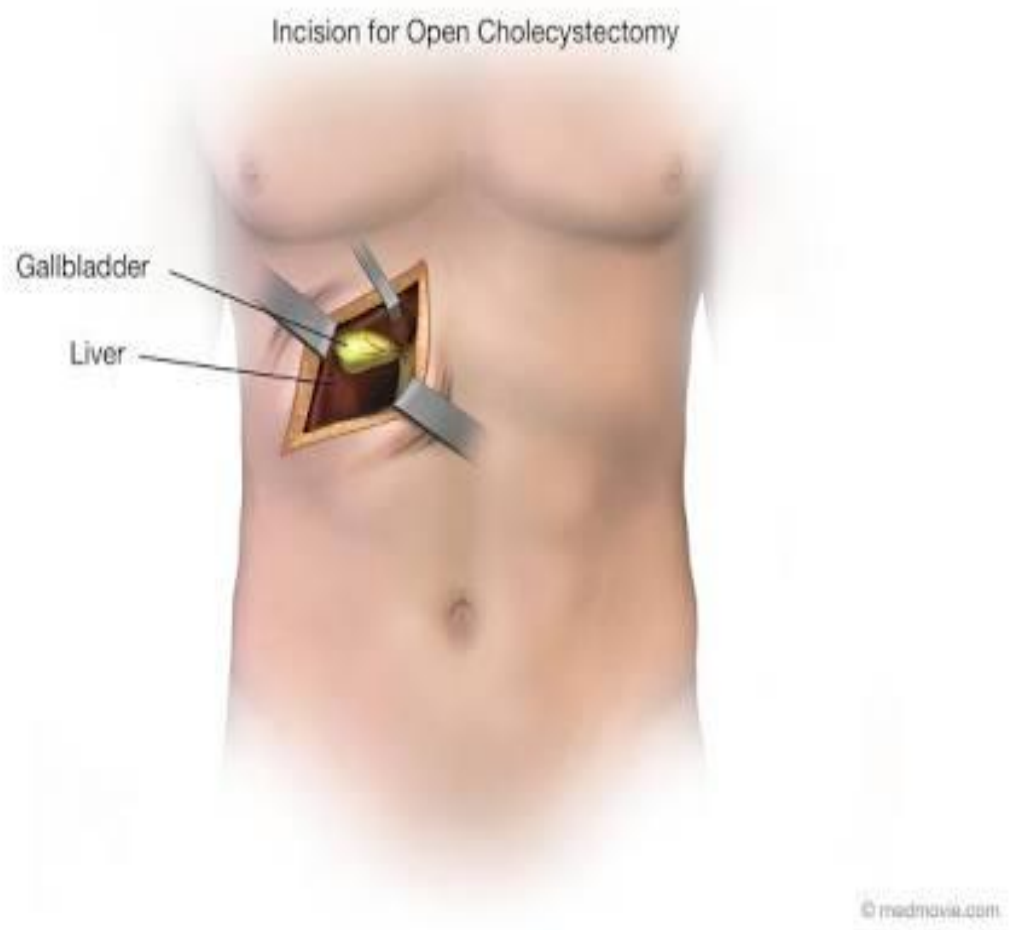
Place a Foley catheter and sequential compression devices before the operation begins, If indicated, administer preoperative antibiotics within 60 minutes of skin incision.

Incision.

Types of Incision:

- Kocher's Incision.
- Modified Kocher's Incision.
- Transverse Incision.

RIGHT SUBCOSTAL INCISION



A right subcostal (Kocher) incision is the most often used incision and

allows excellent exposure of the gallbladder bed and cystic duct. Alternatively, an upper midline incision can be used when other concomitant operations are planned and a wider exposure is needed. Typically, the midline incision remains above the umbilicus, still allowing adequate exposure of the gallbladder with appropriate retraction. A right paramedian incision is another option but is not often used at present.

Start the subcostal incision approximately 1 cm to the left of the lineaalba, about two fingerbreadths below the costal margin (~4 cm). Extend the incision laterally for 10-15 cm, depending on the patient's body habitus.

Incise the anterior rectus sheath along the length of the incision, and divide the rectus and lateral muscles (external oblique, internal oblique, and transversusabdominis) with the electrocautery. Then, incise the posterior rectus sheath and peritoneum and enter the abdomen.

Inspection

To the extent possible, perform a thorough manual and visual inspection to evaluate for concomitant pathology or anatomic abnormalities. Place a retracting device as needed for adequate exposure**.**

Palpate and inspect the liver, and admit air into the subphrenic space to inferiorly displace the liver and better expose the inferior surface. If additional

downward displacement is needed, laparotomy pads can be placed above and lateral to the liver to facilitate exposure. 2 wet mops are placed.One Wet Mop is placed to displace the duodenum, the transverse colon and coils of small intestine.Second Wet Mop is placed slightly to the left of the Common Bile Duct (**CBD**) to displace the stomach to the left.

Retract the duodenum inferiorly to expose the portahepatis.Palpate the gallbladder for stones or masses. The portahepatis can be assessed by inserting the left index finger into the foramen of Winslow and using the thumb to palpate anteriorly on the portahepatis/common bile duct (CBD) for stones or tumors.

Grasp the dome of the gallbladder with a Kelly clamp, and elevate it superiorly. Adhesions to the undersurface of the gallbladder from the transverse colon or duodenum are typically encountered; these can be lysed with sharp dissection or judicious use of the electro cautery.

Dissection of the gallbladder can be performed in two ways.

Duct first method:

Cystic Duct and Artery are dissected first and divided, after which **G**all**b**ladder is removed.

Indication:

Indicated if no presence of adhesions or exudates in CBD, CHD, CD.

Contraindication:

Contraindicated in the presence of adhesions or exudates in CBD, CHD, CD.

Advantages:

Less chance to injure:

- CBD.
- Right Hepatic Artery.

Fundus First method:

Dissection is started from Fundus of the Gallbladder and gradually proceeded towards the Cystic Duct, which is divided last of all.

Indication:

Indicated in the presence of adhesions or exudates in CBD, CHD, CD.

Contraindication:

Contraindicated in no presence of adhesions or exudates in CBD, CHD, CysticDuct due to disadvantages.

Advantages:

Gallbladder can be removed in the presence of adhesions or exudates in CBD, CHD, CD.

Disadvantages:

More chance to injure:

- CBD
- Right Hepatic Artery.

In the retrograde approach, incise the visceral peritoneum overlying of the gallbladder fundus approximately 1 cm from its attachment to the liver. Grasp the fundus of the gallbladder with a Kelly clamp. Using a right-angle clamp or suction device, develop the plane on both the lateral and the medial side of the gallbladder, and carry the incision along the gallbladder parallel to the liver. This dissection ensures complete mobilization of the gallbladder from the liver bed before dissection within the triangle of Calot.

The dissection plane is typically avascular, with only small cholecystic veins that must be divided. Occasionally, more prominent veins may be encountered that must be ligated, especially in the presence of portal hypertension or gallbladder distention. If significant bleeding occurs, the dissection has likely been too deep entering the liver parenchyma.

Division of cystic duct and artery

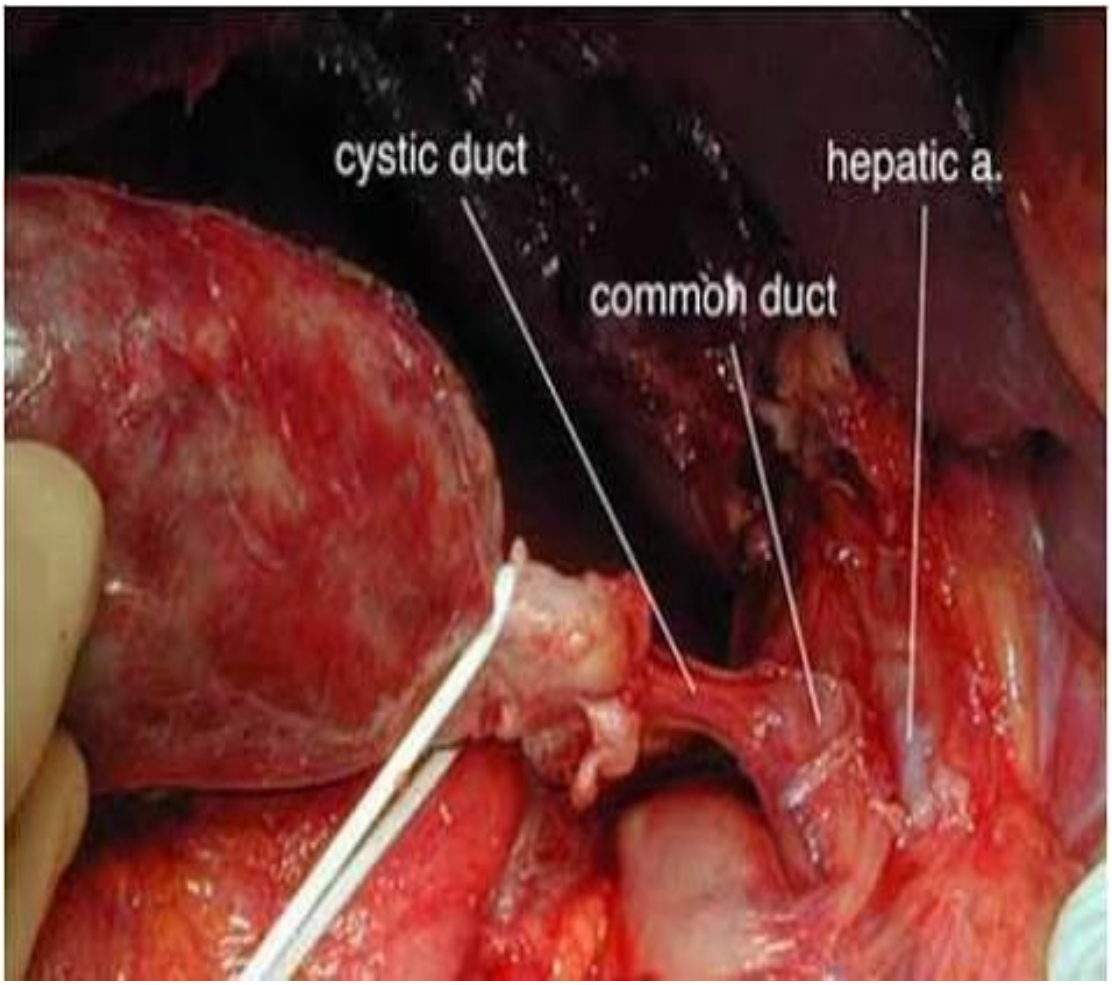
When the cystic duct and artery are correctly identified and completely dissected, they are ligated. Various techniques for ligation have been described, including using suture, staplers, and clips.

Nonabsorbable sutures are acceptable for use on the cystic duct stump;

however, they are not recommended for biliary-enteric anastomosis or choledochotomy suture lines, because they can be lithogenic and incite a chronic inflammatory reaction. Absorbable sutures, such as polyglactin or polydioxanone, are traditionally used for ligation of the cystic duct. Metallic (titanium) clips or locking (Weck) clips can also be used.

If the cystic duct is large and inflamed, mechanical staplers may be used, as well. The cystic artery can be ligated with ties (absorbable or nonabsorbable), suture ligature, or clips. Mechanical staplers are rarely necessary for ligation of the cystic artery.

DIVISION OF CYSTIC DUCT AND CYSTIC ARTERY AND SHOWING CBD



Complications

Although generally a safe procedure with limited morbidity and

mortality,open cholecystectomy does carry a risk of potential complications. Traditionally, the complication rate for this procedure has been reported to be in the range of 6-21%, Though this has likely decreased in the current era patients with Child-Pugh class A or B cirrhosis who are undergoing cholecystectomy for symptomatic cholelithiasis, laparoscopic cholecystectomy has decreased complication rates and increased recovery as compared with open cholecyestectomy.

Infection

Some people develop a wound or internal infection after a gallbladder removal.Signs of a possible infection include increasing pain, swelling or redness, and pus leaking from a wound. Ifthese symptoms develop, may need a short course of antibiotics according to culture and sensitivity.

Bleeding

Bleeding can occur after operation, although this is rare. If it does occur, it may require a further operation to stop it.

Bile leakage

When the gallbladder is removed, special clips are used to seal the tube that connects the gallbladder to the main bile duct.Bile leaks can be caused by clips or ligatures slipping off the cystic duct stump, injuries to the bile ducts, or, most commonly, transected Luschka ducts. Patients may present with

persistent abdominal pain, nausea, vomiting, and elevated liver function test results. Once diagnosed, an endoscopic retrograde cholangiopancreatography (ERCP) can help further characterize the leak as well as provide therapeutic options.

Sometimes this can be managed conservatively when this leak is in very small amount, which may come from the minor biliary radicals from the liver bed. Occasionally, surgery is required to drain the bile and repair the leak.
Bile leakage occurs in around 1% of cases.

Injury to the bile duct

In around 1 in 500 cases, the bile duct is damaged during a gallbladder removal.If this happens during surgery, it may be possible to repair it straight away. In some cases, further surgery is needed after your original operation.

Injury to the intestine, bowel and blood vessels

The surgical instruments used to remove the gallbladder can also injure surrounding structures, such as the intestine, bowel and blood vessels.
This type of injury is rare, occurring in around 1 in 1,000 cases, and can usually be repaired at the time of the operation. Sometimes injuries are noticed afterwards and a further operation is needed.

Deep vein thrombosis

Some people are at a higher risk of developing blood clotsafter surgery. This is known as deep vein thrombosis (DVT) and usually occurs in a leg vein. This can be serious because the clot can travel around the body and could block the flow of blood into the lungs (pulmonary embolism). Compression stockings wear after the operation to prevent this happening.

Risks from general anesthesia

There are several serious complications associated with having a general anesthesia, but these are very rare.Complications include allergic reaction and death. Being fit and healthy before your operation reduces the risk of any complications occurring.

Post-cholecystectomy syndrome

Some people experience symptoms similar to those caused by gallstones after surgery, including:

- Abdominalpain
- Indigestion
- Diarrhea
- Yellowing of the eyes and skin
- Fever

This is known as post-cholecystectomy syndrome (PCS) and it's thought to be caused by bile leaking into areas such as the stomach or by gallstones being left in the bile ducts.

In most cases symptoms are mild and short-lived, but they can persist for many months. If you do have persistent symptoms, may benefit from a procedure to remove any remaining gallstones, or medication to relieve your symptoms.

LAPAROSCOPIC CHOLECYSTECTOMY

- Supine position
- Head end up and right sided
- In general anesthesia

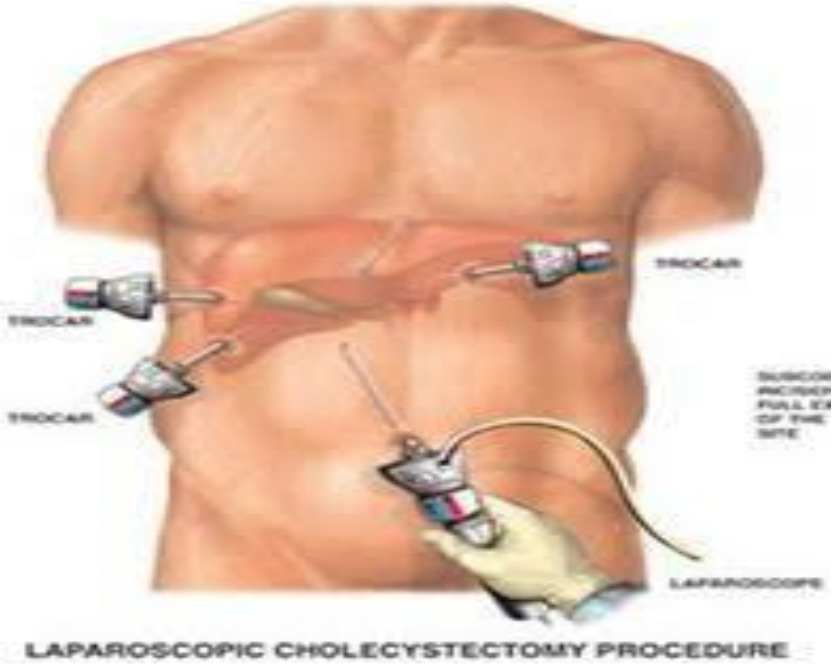
Contraindications to laparoscopic cholecystectomy include the following:

- High risk for general anesthesia
- Morbid obesity
- Signs of gallbladder perforation, such as abscess, peritonitis, or fistula
- Giant gallstones or suspected malignancy
- End-stage liver disease with portal hypertension and severe coagulopathy

PORTS

- 10mm port in umbilicus, to pass 10mm telescope
- 10 mm port in epigastrium as working channel
- Two 5 mm port at mid clavicular and anterior axillary line at subcostal region

PORTS FOR LAPAROSCOPIC COLECYSTECTOMY



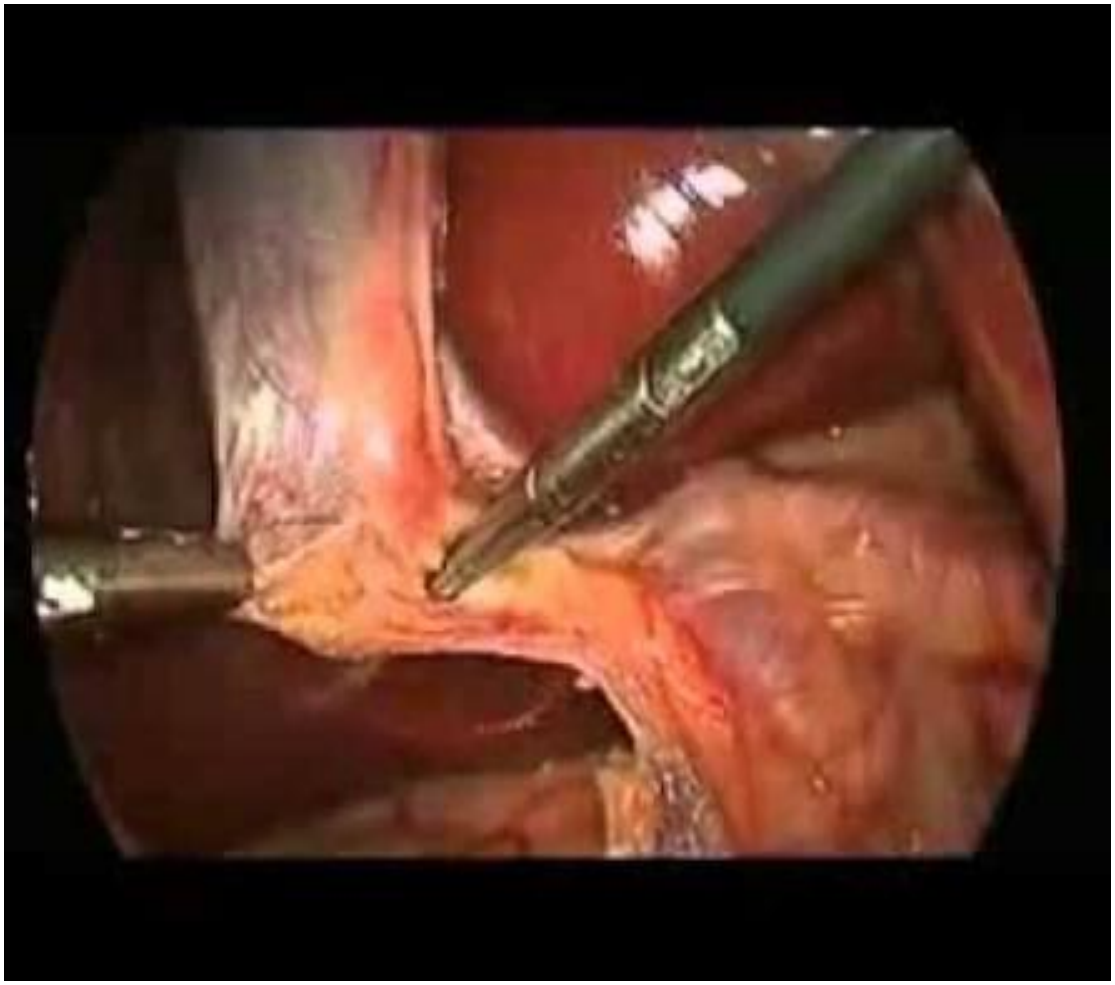
LAPAROSCOPIC CHOLECYSTECTOMY PROCEDURE

PROCEDURE

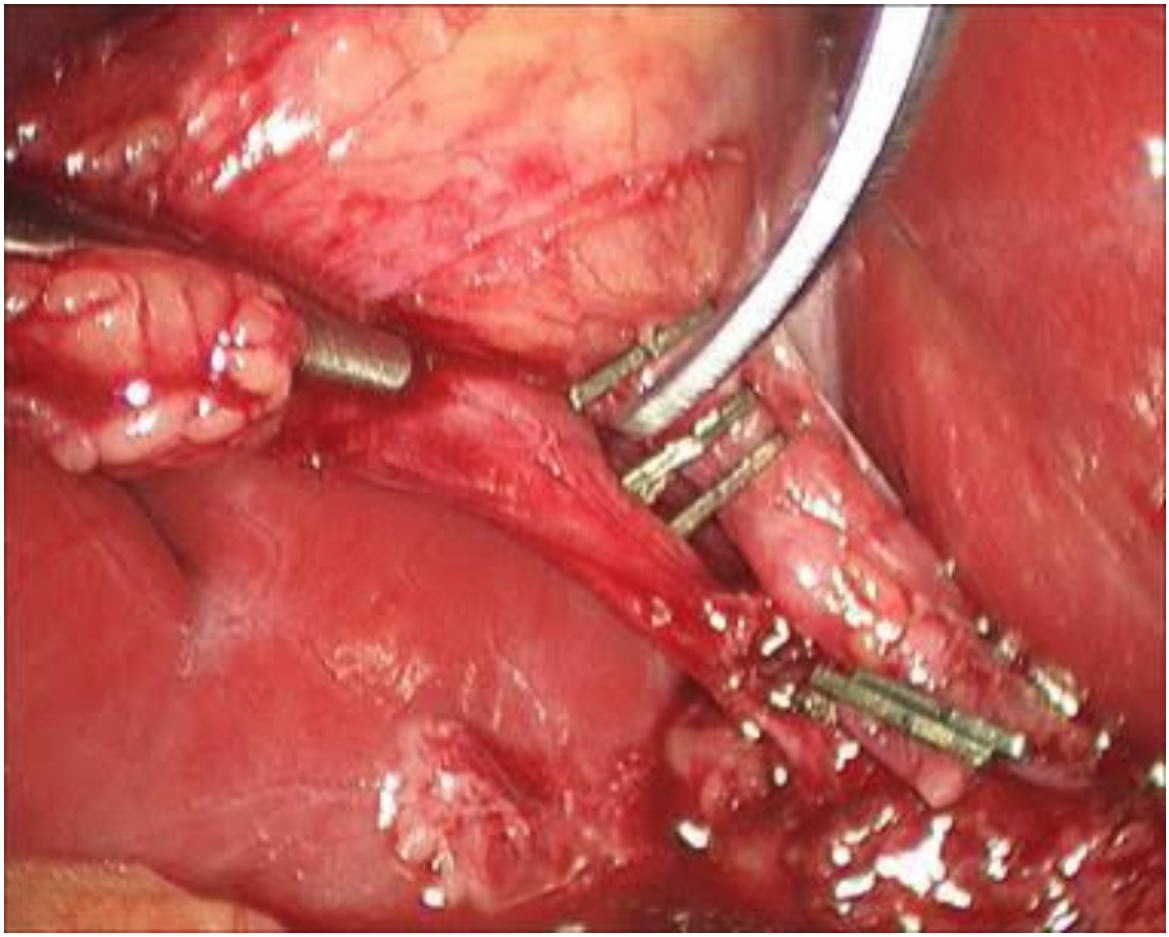
- Creation of pneumoperitoneum with 12-14mm pressure

- 10mm umblical port is inserted, telescope is passed
- All other ports are passed under vision
- With lateral 5mm port Gallbladder grasper forceps is passed and fundus of the gall bladder is held and pushed up
- With 5mm port grasper, hold the hartman's pouch.
- Calot's triangle is dissected
- Cystic duct is identified
- Adhesions are released posterior dissection is completed.
- Cystic duct is clipped cystic artery is also clipped.
- GB is dissected off the liver bed using cautery.
- GB is removed through 10mm working port using sterile bag
- Wound closed in layers

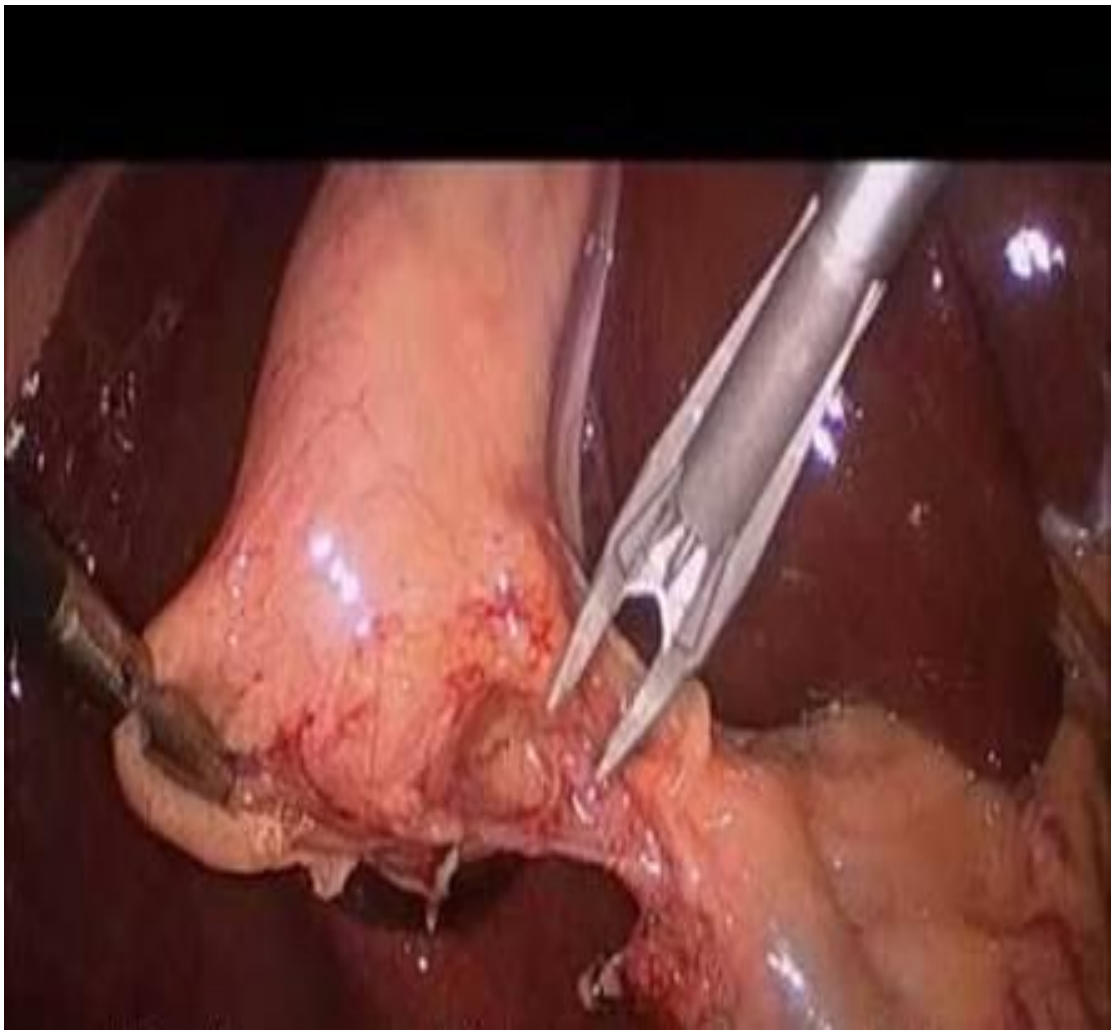
CRITICAL VIEW OF SAFETY



LIGATION OF CYSTIC DUCT



CYSTIC DUCT IDENTIFIED



COMPLICATIONS

- Bileduct injury
- Bleeding
- Bile leak
- Infection
- Cholangitis
- Septicemia
- Subphrenic abscess
- Injury to the other organs

RESULTS

Out of 88 patients in the study 56 patients did not present with pain abdomen. They are diagnosed in USG for the complaints of vague abdominal symptoms like epigastric fullness, early satiety, vomiting after fatty meal. 12 patients presented with features suggestive of acute cholecystitis that includes emphysematous cholecystitis. 20 patients were diagnosed earlier who had few episodes of acute cholecystitis and were treated elsewhere.

Median operating time for lap cholecystectomy was 90-180 min (mean - 143 min) and open cholecystectomy was 65-140 min (mean- 98min). during study operating time for lap cholecystectomy showed tendency to be shorter. Use of analgesics on lap cholecystectomy is considerably less than open cholecystectomy. Conversion rate in our study is 11.4 %(10 cases), inspite of being teaching and training institution.

Table :1 – operating time

Nature of operation	Mean time in MIN	Range of time (min)
Lap cholecystectomy	143	90-180
Open cholecystectomy	98	65-140

It has been observed that duration of post op pain and analgesia required were significantly less in Lap cholecystectomy than open cholecystectomy group

Table: 2 – Pain duration

Nature of operation	Mean duration in days	Range of pain in days
Lap cholecystectomy	1.5	1-4
Open cholecystectomy	4.2	3-8

Mean postoperative hospital stay was 3.7 days in lap cholecystectomy and 6.2 days after open cholecystectomy

Table : 3- Hospital stay duration

Nature of operation	Mean duration in days	Range of stay in days
Lap cholecystectomy	3.38	2-5
Open cholecystectomy	6.7	4-10

Complications were significantly more in open cholecystectomy group than lap cholecystectomy group. Wound infection and dehiscence, intraoperative bleeding, abdominal infection, bile duct injury, pancreatitis, postoperative ileus, death and others were the complications taken into account. In this about 10 patients with open cholecystectomy developed wound

infection where as only 3 developed wound infection in case of Lap cholecystectomy group that too occurred in difficult cases only.

Intraoperative bleeding and bile duct injury are more common in Lap cholecystectomy group than open cholecystectomy especially in case of beginners.

Post op Ileus as found in about 15 cases in case of open cholecystectomy group, which warranted nasogastric tube insertion. In case of open cholecystectomy Lung infection has occurred in about 5 cases as is bedridden due to pain because of which patient could not be ambulated, hence infection ensues.

Table :4 – complications

Complications	Lap cholecystectomy	Open cholecystectomy
Wound infection	3	10
Wound dehiscence	0	2
Peritonitis	1	2
Intraoperative bleed	6	3
Bileduct injury	5	3
Post operative Ileus	2	15
Pancreatitis	0	0
Pulmonary complications	0	5
Death	0	2

In our study series, about 10 cases of lap cholecystectomy were converted to open surgery because of bileduct injury, which warranted open repair like suturing of the bileduct which was difficult in laparoscopy and hepaticojejunal anastomosis that was done due to unrepairable injury. Other reasons for conversion are intra operative bleeding that cannot be controlled laparoscopically, retained stones that cannot be retrievedlaparoscopically, dense adhesions and necrosis of Gall bladder wall.

Time taken for starting oral feeds plays a major role in improving patient general condition and discharge. The time taken for starting oral feeds was less in laparoscopic surgery than open surgery. This improved the patient's general condition, wound healing, ambulation and also promoted early discharge of the patient from the hospital.

Table: 5- time taken for starting oral feeds

Type of surgery	Mean time in days	Range of time in days
Lap cholecystectomy	2.2	1-4
Open cholecystectomy	4	2-6

STATISTICS

T-Test

	n	**Mean**	**S.D**	**Statistical inference**
Age				
Lap	44	43.47	10.119	T=-.664Df=86 .508>0.05 Not Significant
Open	44	44.91	10.221	
Operating time				
Lap	44	142.89	20.071	T=11.428Df=86 .000<0.05 Significant
Open	44	98.95	15.605	
Post of pain duration				
Lap	44	2.56	.841	T=-8.131Df=86 .000<0.05 Significant
Open	44	4.21	1.059	
Duration of hospital stay				
Lap	44	3.89	1.449	T=-7.773Df=86 .000<0.05 Significant
Open	44	6.58	1.789	
Oral feeds				
Lap	44	2.04	1.065	T=-7.865Df=86 .000<0.05 Significant
Open	44	3.93	1.183	

CONCLUSION

Minimally invasive surgery is better than open cholecystectomy in terms of postoperative pain, analgesic requirement, early return to work. However open cholecystectomy is preferred method for surgeons in beginning of their career and in case of difficult dissection and bleeding.

PROFORMA

NAME

AGE/SEX

History of abdominal pain

History of fever

History of vomiting

History of jaundice

PHYSICAL EXAMINATION

Pulse

BP

Respiration

Temperature

LOCAL EXAMINATION

Tenderness, rigidity, distension.

INVESTIGATIONS

Hb

Blood group and typing

Blood urea, S.creatinine, and blood sugar

Liver function test

Plain X ray abdomen, chest

Ultra sonogram

CT abdomen

TREATMENT

OPERATIVE PROCEDURE:

OPERATING TIME

NO. OF DAYS OF PAIN

TIME OF STARTING ORAL FEEDS

INTRAOPERATIVE BLEEDING – YES / NO

BILE DUCT INJURY – YES / NO

NO. OF DAYS WITH POST OP ILEUS

NO. OF DAYS OF HOSPITAL DAY

FOLLOW UP

IMMEDIATE POST OP

ROUTINE FOLLOW UP

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S NO	NAME	AGE/SEX	LAP/OPEN	OPERATING TIME	OF PAIN DURATION	OF HOSPITA	wound infection	wound dehiscenc	INTRAOP BLEED	ILE DUCT INJUR	POST OP ILEUS	ORAL FEEDS
1	ramalingam	46/m	lap	140	2	4	-	-	-	-	-	2
2	saroja	55/f	open	100	5	6	-	-	-	-	-	3
3	ramesh	26/m	open	110	3	5	-	-	-	-	-	4
4	arumugam	33/m	lap	160	2	3	-	-	-	-	-	1
5	selvapandi	47/m	open	90	6	9	+	-	-	-	+	5
6	antony raj	36/m	lap	120	3	3	-	-	-	-	-	1
7	kuppusamy	45/m	open	80	4	5	-	-	-	-	-	3
8	suseela	38/f	lap	125	2	2	-	-	-	-	-	1
9	ramkumar	48/m	lap	145	2	3	-	-	-	-	-	1
10	selvarani	36/f	open	100	6	10	+	+	-	-	+	5
11	baranikumar	28/m	lap	150	3	4	-	-	-	-	-	2
12	chandra	32/m	open	120	4	6	-	-	+	-	-	3
13	jeyaprakash	40/m	open	105	4	5	-	-	-	-	-	3
14	ragini	42/f	lap	165	2	2	-	-	+	-	-	2
15	geetha	38/f	open	100	5	9	-	-	-	-	+	7
16	varatharjan	53/m	lap	130	3	4	-	-	-	-	-	2
17	suguna	36/f	open	70	4	5	-	-	-	-	-	3
18	manimaran	35/m	lap	160	2	4	-	-	-	+	-	2
19	vanaja	46/f	lap	150	4	3	-	-	-	-	-	1
20	manoj	32/m	open	90	2	7	-	-	-	-	+	5
21	rathinavel	52/m	lap	140	5	3	-	-	-	-	-	2
22	manonmani	51/f	open	85	3	7	-	-	-	-	+	5
23	prabhu	31/m	lap	150	3	4	-	-	-	-	-	1
24	saravanan	44/m	open	100	5	7	-	-	-	-	+	6
25	ramasamy	57/m	open	90	7	10	+	+	-	-	-	4
26	ramani	48/m	lap	140	2	3	-	-	-	-	-	3
27	rakayee	65/m	open	110	5	6	-	-	-	-	-	4
28	guru	36/m	lap	150	3	5	+	-	-	-	-	2
29	petchiammal	62/f	open	85	5	8	-	-	-	-	+	6
30	rajeev	45/f	lap	170	2	8	-	-	-	+	+	4
31	ranjitham	62/f	lap	160	4	4	-	-	+	-	-	2
32	surja	27/m	lap	170	2	5	-	-	+	-	-	2
33	danapal	55/m	open	110	4	6	-	-	-	-	-	3
34	bavani	49/f	lap	100	4	3	+	-	-	-	-	4
35	yasmin	47/f	lap	140	2	7	-	-	-	-	-	1

36	ilavarasan	42/m	open	140	4	6	-	-	-	+	+	5
37	vigneshwari	28/f	open	90	3	5	-	-	-	-	-	3
38	narayanan	56/m	lap	120	3	6	-	-	-	-	+	3
39	parameshwa	37/m	open	70	4	2	-	-	-	-	-	4
40	paulraj	40/m	lap	135	2	2	-	-	-	-	-	2
41	kalaiselvi	37/f	lap	160	2	3	-	-	+	-	-	1
42	thanraj	57/m	lap	140	2	3	-	-	-	-	-	4
43	kalamegam	44/m	open	80	2	9	+	-	-	-	-	3
44	senthilkumar	30/m	lap	155	4	4	-	-	-	-	-	1
45	marikannu	60/f	open	110	5	8	-	-	-	+	+	6
46	divya	29/f	lap	140	2	4	-	-	-	-	-	2
47	kamaraj	50/m	open	90	4	7	-	-	-	-	-	5
48	alamelu	52/f	lap	120	2	3	-	-	-	-	+	2
49	ganesh	39/m	open	100	4	6	-	-	-	-	-	4
50	rajathi	65/f	lap	130	2	3	-	-	-	-	-	3
51	girija	46/f	open	85	4	9	+	-	-	-	-	3
52	hariharan	27/m	open	90	3	5	-	-	-	-	-	3
53	prem	29/m	lap	140	2	3	-	-	-	-	-	1
54	prabahar	36/m	open	100	5	8	+	-	-	-	-	4
55	kandasamy	54/m	lap	155	3	4	-	-	-	-	-	2
56	palaniammal	44/f	lap	145	2	3	-	-	-	-	-	2
57	selvaraj	56/m	open	100	6	6	-	-	-	-	-	2
58	fathimabanu	41/f	lap	110	2	3	-	-	-	-	-	3
59	jeyanthi	45/f	lap	160	3	8	-	-	-	+	-	4
60	karupusamy	58/m	open	120	4	5	-	-	+	-	-	3
61	wilson	36/m	open	90	4	6	-	-	-	-	-	3
62	devi	36/f	open	135	2	4	-	-	-	-	-	2
63	mukaiyan	59/m	lap	165	2	4	-	-	+	-	-	1
64	naveen	43/m	lap	80	5	6	-	-	-	-	-	3
65	parvatham	60/f	open	100	4	7	-	-	-	-	+	5
66	rajalingam	53/m	open	90	4	9	+	-	-	-	-	3
67	mary	39/f	lap	175	3	5	+	-	-	+	-	4
68	santhi	44/f	open	105	4	6	-	-	+	-	-	4
69	divakar	33/m	lap	150	2	3	-	-	-	-	-	1
70	banumathi	52/f	open	100	5	6	-	-	-	-	-	3
71	sivaraman	44/m	open	90	3	8	+	-	-	-	-	3

72	kannan	38/m	lap	140	2	4	-	-	-	-	-	1
73	thekan	58/m	open	110	5	8	+	-	-	-	-	3
74	veeraiyan	56/m	lap	165	2	3	-	-	+	-	-	2
75	charu	32/f	open	120	4	4	+	-	+	-	+	5
76	vadivelu	51/m	open	90	4	7	-	-	-	-	+	5
77	sankari	40/f	open	130	4	9	-	-	-	+	+	5
78	tamilselvi	38/f	lap	145	2	4	-	-	-	-	-	1
79	deva	44/m	lap	170	3	7	+	-	-	+	+	5
80	abdullah	38/m	lap	150	2	3	-	-	-	-	-	2
81	sathish	43/m	open	90	4	5	-	-	-	-	-	3
82	rosemary	37/f	open	110	4	4	-	-	-	-	-	3
83	samira	53/m	lap	120	2	3	-	-	-	-	-	2
84	rengarajan	45/m	lap	110	2	3	-	-	-	-	-	1
85	rajesh	52/m	open	90	5	7	-	-	-	-	-	3
86	muniammal	61/f	lap	135	3	4	-	-	-	-	-	2
87	rangan	28/m	open	150	2	3	-	-	-	-	-	1
88	thangam	49/f	open	85	5	6	-	-	-	-	+	5